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DAIMLERCHRYSLER

NHTSA-2002-11398-3

DaimlerChrysler Corporation
Matthew C. Reynolds
Director
Vehicle Compliance & Safety Affairs

October 16, 2001

The Honorable Jeffrey W. Runge, M.D.
Administrator
National Highway Traffic Safety Administration
400 Seventh St. S.W.
Washington D. C. 20590

Dear Dr. Runge:

Re: Petition for Rulemaking, FMVSS 208, Advanced Air Bag Rulemaking, Docket No. 99-6407

On July 11, 2001 representatives of DaimlerChrysler Corporation and Mercedes-Benz USA met with senior NHTSA staff to discuss the state of the development of occupant sensing technology with regard both to ensuring compliance with the FMVSS 208 Advanced Air Bag Interim Final Rule and ensuring safety in real world applications. Specifically we discussed the need for the agency to quickly respond to our petition for reconsideration on the final rule published on May 12, 2000 and additional measures that our development programs revealed are necessary. Following that meeting, confidential and public versions of our presentation (attached) were submitted to NHTSA for further examination and study.

This letter is intended to follow up on that meeting, to request that NHTSA address the concerns set forth in our petition for reconsideration and to underscore the changed state of technology since the time NHTSA issued the rule. This submission also constitutes a petition formalizing our requests for changes to the current advanced air bag final rule made at the meeting on July 11, 2001.

DaimlerChrysler Corporation and Mercedes-Benz USA explained to the agency not only the difficulties in ensuring reliable compliance with the new requirements, but also the difficulties in ensuring reliable real world performance of these new technologies. Consequently, DaimlerChrysler Corporation and Mercedes-Benz USA ask the agency to act immediately on the reconsideration petition filed with

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the agency on June 26, 2000. In particular, we ask the agency to act on the following key requests made in that petition:

- Increasing the separation of speed (at least 9 MPH) between the unbelted rigid barrier test and the low risk deployment (LRD) air bag inflation stage determination test;
- Replacing the 50th percentile male dummy in LRD threshold tests with 3 year old, 6 year old and 5th percentile female dummies in S22.5.1, S24.4.4 and S26.1(b) respectively;
- Applying consistent scaling laws to establish injury criteria for the 5th percentile female and 6 year old dummies;
- Applying neck axial force as the sole criteria for assessing the potential for neck injury until a more bio mechanically accurate ATD is available (the Thor dummy developed by NHTSA appears to be appropriate); and
- Numerous lesser technical issues.

In addition, as discussed in the July 11, 2001 meeting, and as set forth in the documents submitted to NHTSA subsequent to that meeting, DaimlerChrysler Corporation and Mercedes-Benz USA petition the agency for the following additional actions:

- Allow passenger air bag "on/off/auto" switches for vehicles with three across front seating;
- Allow transponder technology for reliable child restraint system detection;
- Provide at least a 9 mph speed separation between the LRD threshold and lowest speed unbelted rigid barrier test **and** for the 16 mph threshold test, specify the 5% female ATD or allow, at the manufacturer's option, the same dummy as the one used in the static low risk deployment test;
- Revise "low risk" deployment out-of-position test duration to less than 100 ms. and;
- Revise the phase-in requirements to 10 - 40 - 100% for Phase 1 of the Rule.

In support of the above additional points, we provide the following comments and information for your consideration.

Data from the July 11, 2001, meeting showed that from occupant tests of three across seating, the interaction of an occupant in the center seating position will lead to the misclassification of occupants in the passenger seat. While not a compliance issue, this is a real world concern we believe must be addressed. The allowance of passenger air bag "on/off/auto" switches for three across seating will provide consumers with the ability to tailor the appropriate air bag configuration,

thus avoiding any misclassification. A passenger air bag "on/off/auto" switch is an appropriate means of addressing the risk to children resulting from misclassification due to the presence of a person in the center seating position. In addition, as data in the Toyota petition for rulemaking shows, unless a significant breakthrough in occupant classification sensing technology occurs within the next few months, passenger air bag "on/off/auto" switches may be necessary on all advanced air bag vehicles.

We again wish to state that there are no robust sensing systems available for occupant classification that can discriminate adults from children in child restraint systems for all real world conditions. Data presented during the July 11, 2001 meeting demonstrates that a 5th percentile female in "normal" seating positions can not be discerned from a child restraint system "normally" positioned. This problem would be greatly expanded by the wide range of seating positions and postures expected in the real world. This further emphasizes our point and supports our request for the allowance of transponder-based, tagging detection systems for child restraint systems. While more robust systems may be developed in the future, they are not available for the 2004 model year at this time. Transponder technology is the most reliable means to detect child restraints and suppress air bag deployment. We believe the agency's action in the LATCH rulemaking, where it recognized the need for both child restraint and motor vehicle manufacturers to take action to protect children, is a model that can be followed in this area. NHTSA recognized that vehicle manufacturers by themselves could not take action that would ensure easier and safer installation of child seats and it wisely developed a system that involved both industries. The same can be done here, where both future vehicles and child restraints would have compatible transponder/receiver devices. We take note of the agency's concern about a transition period but believe action should be initiated now and we offer our assistance in developing interim solutions.

In addition, to preserve the agency's intended option of "low risk deployment" as well as the air bag "suppression" option, we reiterate the need for a 9 mph speed separation between the LRD threshold and the lowest speed unbelted test. This request is clearly laid out in our June 26, 2000 petition for reconsideration. In the intervening time, it has become necessary to **couple** the speed separation request **with** substituting the 5th percentile female ATD for the 50th percentile male in the 16 mph threshold test, or allow, at the manufacturers option, the same dummy as the one used in the static LRD test. These two conditions are needed because available crash severity sensor technology cannot reliably differentiate 16 mph from 20 mph impacts in a full range of products, while occupant sensing cannot reliably determine the occupant. The inclusion of both, however, does allow for the possibility of a more reliable system.

Also, we request that the "low risk" deployment, out-of-position test duration in S4.11 be reduced from 300ms to less than 100ms. As explained in our letter to

the Agency of February 23, 2001, this is necessary to eliminate dummy interaction with the seat or other interior components from airbag interaction data in low risk deployment out-of-position tests. Any dummy contact with the vehicle interior after air bag interaction is complete corrupts the data creating confounding results that are unrelated to air bag harm during the deployment process.

Finally, due to the uncertainty surrounding the status of the numerous outstanding petitions to the Final Rule, supplier capacity assurances and the performance capability of current level of technology, we petition NHTSA to alter the FMVSS 208 Advance Air Bag Phase 1 phase-in requirements from 35-65-100-100% to 10-40-100-100%. Lack of technology readiness and capacity for meeting the advanced air bag requirements of FMVSS 208 have reduced the production tooling lead-time to a precarious situation.

We participated in the development of the petition for reconsideration submitted by the Alliance of Automobile Manufacturers, and fully endorse it where it is not inconsistent with this petition.

After reviewing this petition to the Advanced Air Bag Final Rule, should you need further information, please contact Mr. W. R. Edwards at 248-576-7303.

Sincerely,

Matthew C. Reynolds

Attachment: July 11, 2001 Presentation (Public Version)

DAIMLERCHRYSLER

FMVSS 208 Interim Final Rule: Review of DaimlerChrysler's Petition for Reconsideration and FMVSS 208 Development Efforts

Objectives of Meeting

- Reinforce the need to accept our June 2000 petition for reconsideration to the FMVSS 208 interim final rule.

- Accept recommended rulemaking petitions to support the development of a weight based, suppression/low risk advanced airbag system providing real world benefit.

- Highlight new challenges to compliance that may require phase in percentages to be revised.

Presentation Outline

- Key Points from January 2001 DaimlerChrysler Presentation
- FMVSS 208 Compliance Options - January 2001
- Important Events Since January
- Suppression Technology Challenges
- Proposed Modifications To Meet The Spirit of TEA 21 and Implement FMVSS 208
- Conclusions

Key Points from January 2001 Presentation

- Low Risk Deployment (LRD) is the Best Strategy
  - Offers the best real world protection for all occupant sizes under the widest range of conditions

- Need separation of test speeds to make LRD work consistently with known sensor technologies (single point, multi-point, etc.)
  - Cannot assure LRD stage at 16 mph with 20 - 25 mph unbelted test speed range

OR

- Need the occupant in the 16 mph threshold test to be the same as the one used in the static LRD test

- 40 mph rigid barrier test speed makes LRD infeasible for rear facing infant seats (RFIS), thereby requiring development of occupant classification systems.

- Weight sensing offers the best opportunity for compliance.

- Data collection interval less than 300 ms (less than 100 ms) required for LRD static tests.

- Transponders (electronic tags) remain the most reliable method of detecting rear facing infant seats (RFIS)

FMVSS 208 Compliance Options (01/2001)

	Compliance Alternatives		
6 Year Old / 3 Year Old	Suppression	LRD	LRD
Infant	Suppression	Suppression	LRD
Barriers to Implementation		• Crash sensing system cannot consistently separate 16 mph from 20-25 mph barrier test • 20-25 mph rigid barrier airbag too aggressive to achieve LRD • 300 ms LRD data collection interval too long	• Crash sensing system cannot consistently separate 16 mph from 20-25 mph barrier test • 20-25 mph rigid barrier airbag too aggressive to achieve LRD • 300 ms LRD data collection interval too long • 40 mph airbag stage too aggressive for RFIS
Enablers Required		• Revise LRD OOP test to less than 100 ms • Provide 9 mph speed separation between LRD and unbelted tests **OR** • Make occupant in the 16 mph threshold test to be the same as the one used in the static LRD test	• Revise LRD OOP test to less than 100 ms • Provide 9 mph speed separation between LRD and unbelted tests **OR** • Make occupant in the 16 mph threshold test to be the same as the one used in the static LRD test

Important Events Since January

- Supplier community unable to provide a robust weight sensing system that functions across the full range of real world vehicle environments.

- Development history does not support a prediction that a robust weight sensing system will be available within the TEA 21 phase-in time frame.

- A robust weight sensing system will not be available for implementation into development of vehicles for the 2004 model year.

Important Events Since January

- Bench testing has not translated into real-world performance:
  - Overload due to rough road and real world low speed impacts
  - Off axis loading
  - Vehicle build tolerances
  - Temperature sensitivity
  - Life time calibration

Suppression Technology Challenges

- The significant timing and technical challenges for '04 MY forced DaimlerChrysler companies to consider interim compliance options.

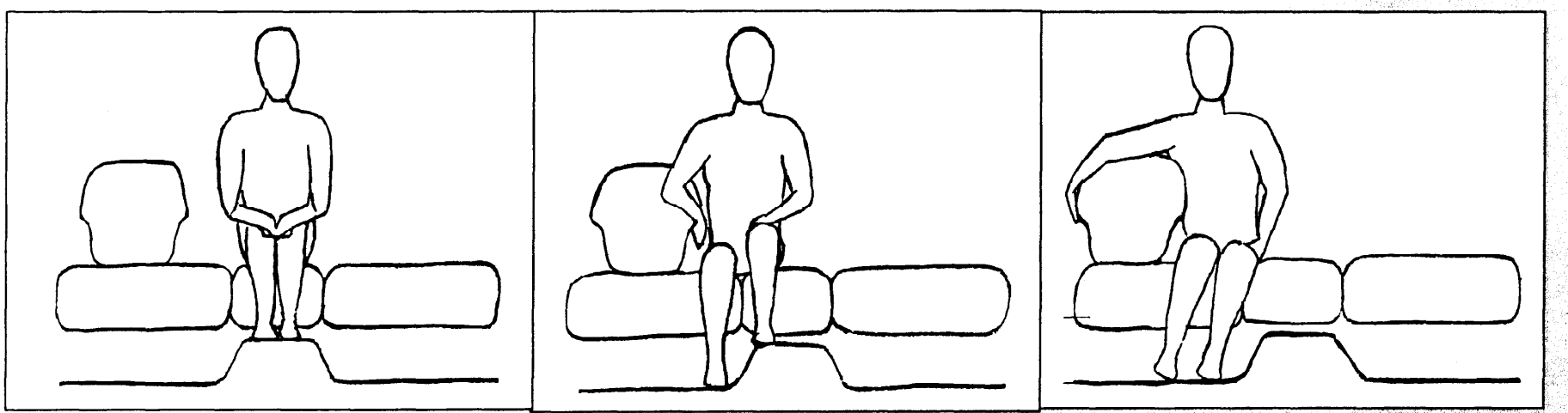
- Other system choices have been analyzed and are not as robust

Known Challenges for Interim Technology

- Interim technology cannot provide consistent compliance results
- For the interim technology, the separation between a belted child seat (with corrections made by belt tension sensor) and 5th percentile female is inadequate
- The interim technology cannot reliably discriminate 5th percentile female from RFISs, 3 year-olds and 6 year-olds in real-world seating positions

Three-Across Seating

- No reliable solution is available for three-across seating
- Testing shows that a center occupant can cause an outboard passenger to be mis-classified
- Over 3 million customers buy this feature annually industry-wide in passenger car and pickup truck applications



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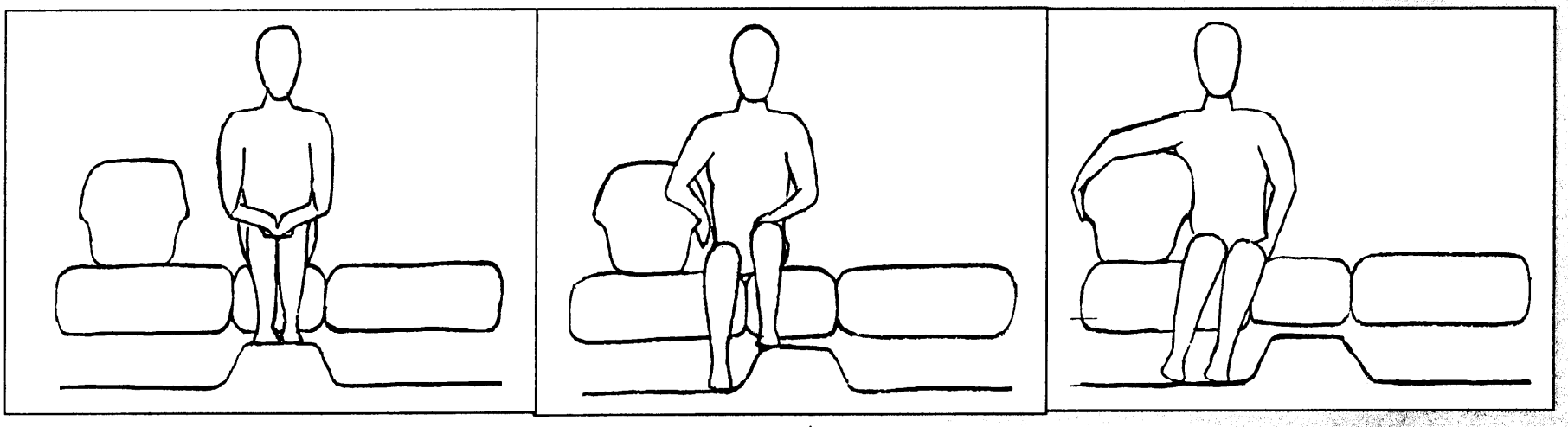

16 mph LRD Threshold Test

- Conditions needed for the 16 mph LRD threshold test:
  - provide 9 mph separation between LRD threshold and lowest unbelted test.

    AND
  - instead of the 50% male ATD, specify the 5% female ATD for the 16 mph threshold test and also allow, at the manufacturers option, the same dummy as the one used in the static LRD test (still unbelted as stated in final rule).
    - i.e. for 6 year old LRD static test, use the airbag that a 6 year old would get in a 16 mph barrier test, etc.
- Both conditions are now needed because:
  - Available sensor technology can not reliably differentiate 16 mph from 20 mph impact in a full range of products.
  - Different restraint levels are required to protect various occupants at 16 mph across a range of vehicles. Matching the threshold and static LRD occupant allows us to meet the unbelted requirement and optimize OOP performance.

FMVSS 208 Compliance Options

	Compliance Alternatives		
6 Year Old / 3 Year Old	**Suppression**	**LRD**	**LRD**
Infant	**Suppression**	**Suppression**	**LRD**
Barriers to Implementation	• **Can not reliably separate 5th % female and 6 year old ATD to consistently comply** • **Real world concerns remain**	• Crash sensing system cannot consistently separate 16 mph LRD from 20-25 mph barrier • 20-25 mph rigid barrier airbag too aggressive to achieve LRD • 300 ms LRD data collection interval too long	• Crash sensing system cannot consistently separate 16 mph LRD from 20-25 mph barrier • 20-25 mph rigid barrier airbag too aggressive to achieve LRD • 300 ms LRD data collection interval too long • 40 mph airbag too aggressive for RFIS
Enablers Required	• **Allow "On-Off-Auto" Switch on all vehicles with 3 across seating on a permanent basis** • **Modified phase-in (10%/40%/100%) due to implementation delays** • **Enablers for consistent compliance & real world concerns are still being studied**	• Revise LRD OOP test to less than 100 ms • Provide 9 mph speed separation between LRD and unbelted tests **AND** For the 16 mph threshold test, specify the 5% female dummy and at the manufacturers option, allow use of the same dummy as the one used in the static LRD test • **Allow "On-Off-Auto" Switch on all vehicles with 3 across seating on a permanent basis** • **Modified phase-in (10%/40%/100%) due to implementation delays** • **Allow electronic tagging**	• Revise LRD OOP test to less than 100 ms • Provide 9 mph speed separation between LRD and unbelted tests **AND** For the 16 mph threshold test, specify the 5% female dummy and at the manufactures option, allow use of the same dummy as the one used in the static LRD test • **Use 16 mph LRD threshold test for RFIS**

Benefits of Transponders (Tagging)

- Currently transponders are the most reliable means for detecting a rearward or forward facing child seat in the front passenger seat.
- Transponders are currently in production vehicles and CRS.
- Antenna in the seat cushion detects a tag mounted on CRS.
- Transponders can be adapted to existing child seats
- Tags would be provided with vehicle at no cost to owners with instructions for self or dealer installation on non transponder equipped CRS.
- Ultimately these transponders would become standard in all new child restraint systems like the LATCH system.

Conclusions

- Both options (suppression or low risk) for FMVSS 208 compliance have several unresolved technical issues:
  - Unreliable occupant classification technology and prohibition of transponder technology preclude successful application of suppression systems
  - Limitations in crash speed sensing discrimination preclude the successful application of low risk deployment systems
- Rulemaking changes are needed to help resolve technical issues

Conclusions

- NHTSA is integral to successfully implementing FMVSS 208
- Support the DaimlerChrysler rulemaking petitions